

Chapter 2 - Alternatives

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CHAPTER 2 - ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Introduction

This chapter is intended to provide a clear explanation of the activities proposed in the action alternatives, including resource protection measures. It describes and compares the alternatives considered for the Black Hills Project. A summary of the manner in which the alternatives respond to the purposes of the proposal, followed by an issue-related effects comparison, is displayed at the end of this chapter.

Precision of Information

Acres, miles, other quantifiable amounts, and mapped area boundaries used to describe these alternatives are based on the best available information. Information used in designing the alternatives was generated from a mix of extensive field reconnaissance, use of ortho-photos, Global Positioning System (GPS) technology, Geographic Information System (GIS) and various resource-specific databases.

Alternatives Considered, But Not in Detail

An alternative was considered that would have included utilizing some sort of cable system to log the steep areas on and around Spodue Mountain. This alternative was not fully developed because the soil types that occur on Spodue Mountain are highly susceptible to displacement and it is believed that cable logging would result in unacceptable consequences to soils and to the scenic integrity of the area.

Alternatives

Three alternatives were fully developed and analyzed. These are:

- **Alternative 1 – No Action**
- **Alternative 2 – Proposed Action**
- **Alternative 3 – Alternative to the Proposed Action.** Helicopter thinning stands have been dropped in this alternative. Forested stands on Spodue Mountain would be treated primarily through the use of prescribed fire. Thinning treatment corridors have been designated along existing roads on Spodue Mountain to provide for safe ingress and egress and to act as fuel breaks. Allocated old growth stands (MA 3 and MA 14) would not be treated by thinning under this alternative.

Alternative 1 – No Action

Under this alternative, no thinning, prescribed fire, road closures and decommissioning, or other restoration actions, unless authorized by another planning process, would occur in response to the need for the proposal. Ongoing management practices (such as limited road maintenance, fire suppression, and livestock grazing) could continue with the selection of this alternative.

Action Alternatives

Alternative 2 is the proposed action, as briefly introduced in Chapter 1. Here the proposed action has been further refined by the addition of details of the prescribed treatments and specific project design elements. Scoping of the proposed action for the Black Hills Project (Forest Service letter dated June 10, 2009) included some small tree thinning by chainsaw along the Sycan Wild and Scenic River. The proposed action addressed in this document has been modified by dropping the chainsaw thinning along the Sycan River.

Alternative 3 was developed as a response to public input that raised concerns related to proposed thinning treatment of Forest Plan allocated old growth stands and internal discussions that questioned the feasibility of using a helicopter logging system in light of the related economic challenges.

No new permanent road construction or reconstruction is proposed by either action alternative.

The analysis in this document occurs prior to the administrative step of designating specific activity names or unit numbers (i.e. specifically-named timber sales with numbered “units” or burning/prescribed fire “units”). Implementation of the actions discussed below is expected to begin during 2011 and is expected to take 10 to 15 years to complete.

Actions in both alternatives would be completed through a variety of mechanisms including, but not limited to, Stewardship authority, Public Works Contract, Cooperative Agreement, and Forest Service workforce.

Activities Common to Action Alternatives 2 and 3

Forest Plan Amendment to cut white fir trees greater than 21 inches dbh

Project level Forest Plan Amendment of Regional Forester’s Eastside Forests Plan Amendment 2 for the Fremont National Forest Land and Resource Management Plan. Allow for thinning white fir trees greater than 21 inches dbh where it would support ecological restoration goals.

The Pacific Northwest Region (R6) encouraged Forests to consider site-specific Forest Plan amendments where it will better meet LOS objectives by moving the landscape towards HRV, and provide LOS for the habitat needs of associated wildlife species (Guidance for Implementing Eastside Screens, USDA Forest Service, Goodman 2003). For the Black Hills Project, flexibility in implementing the 21” diameter limitation would be appropriate under the following scenarios:

- Moving multiple-layered ponderosa pine stands towards LOS of a single layer where the pine are competing with grand fir or other shade-tolerant species historically held in check by wildfire.
- Maintaining shade-intolerant desirable trees <21 inch dbh where their recruitment into the >21 inch class is reasonably foreseeable in the near future, and when giving preference to them better meets LOS objectives.

The restoration strategies by Dr. Norm Johnson and Dr. Jerry Franklin (2009) also describe circumstances where removal of young white fir trees >21" would be essential to restoring dry forests:

- Diameter limits can deter the harvest of young (generally less than 150 years), relatively large trees that crowd older trees, greatly increasing the risk that the old trees would die as a result of either wildfire or insect attack.

Removal of white fir trees greater than 21 inches dbh would be limited to instances where it would be expected to benefit an adjacent old (generally more than 150 years) ponderosa or sugar pine tree. Generally, this would be those cases where a large white fir tree is in direct competition (within 2x the radius of the dripline) with an old ponderosa or sugar pine tree that is the focus of restoration efforts.

Under the ground-based thinning scenarios of Alternative 2 or 3 there could be up to 6,000 acres of pine associated stands treated that would result in cutting about two white fir trees per acre greater than 21 inches dbh.

Under the helicopter logging identified in Alternative 2, there would be approximately 2,600 acres of additional pine associated stands thinned that would also result in cutting about two white fir trees per acre greater than 21 inches dbh.

Small Tree Thinning (with and without extraction)

Thin small diameter trees (<12 inches dbh) using chainsaw, mechanized equipment and/or prescribed fire on approximately 302 acres. This includes the Spodue Evaluation Plantation that would be selectively thinned into a seed production area and the old existing fence would be removed. With the exception of the Evaluation Plantation, a minimum of 5-15% of each treatment unit greater than 20 acres would be left unthinned (skips) to provide for mule deer cover and wildlife diversity across the landscape. Unthinned patches would be irregular in shape and range in size from 1/8 to 1/2 acre. Material that can be utilized for small diameter logs or biomass would be removed. Where necessary in areas where activity slash could not be removed, generated slash would be treated by mechanical crushing. Stands to be treated are shown on Map Figure 2-1 Alternative 2 Treatment Areas and Map Figure 2-2 Alternative 3 Treatment Areas at the end of Chapter 2.

Temporary Roads

Up to 5 miles of temporary roads may be necessary to provide access to thinning treatment areas and allow for removal of forest products. All temporary roads would be constructed to low-standards, used for only a short duration, and decommissioned following timber harvest and hauling activities. All temporary road-related activities would follow the direction contained in BMPs (Appendix B). A complete description of *road decommissioning*, a term used throughout this EA document, is found below under the heading ***Road Management Activities***.

Treatment of Sycan Wild and Scenic River Corridor

Prescribed fire would be utilized in the corridor to reduce the excess fuel buildup and allow fire to play a more natural role in the ecosystem. Some pre-treatment in the form of hand chainsaw work and slash piling may be necessary in a few areas of the corridor.

Prescribed Fire Landscape Treatments

Approximately 20,000 acres (*potentially including Valens private lands implemented under a Wyden agreement*) would be treated with prescribed fire to create conditions that mimic historic landscape vegetative structure, patterns, and disturbance regimes. Underburning would be implemented to produce a mosaic of approximately 60% burned and 40% unburned areas. To the extent possible, large snags and large down woody debris would be protected. Existing roads, natural openings and features would be used as control lines where possible. Where roads are overgrown, road clearing and brushing would occur if needed to insure fire line effectiveness. Fire control lines would be constructed to the minimum level sufficient to ensure firefighter safety and to control fire spread. Constructed fire line would be rehabilitated in accordance with the guidelines contained in the project resource protection measures.

Priorities for prescribed fire treatment are closely aligned with forest vegetation types in the project area. First priority would be to treat a band in the lower elevation pine stands around the base of Spodue Mountain, including along the main road corridor through the project area and the area right around Spodue Fire Lookout. Second priority would be the pine associated stands on Spodue Mountain and finally third priority would be the stringer stands and lodgepole pine stands in the project area (See Map Figure 2-3 Prescribed Fire Landscape Treatment Strategy at the end of Chapter 2). Prescribed fire applications would generally be implemented after the completion of thinning activities, over a period of about 3-10 years to allow adequate time for contract work to be performed, and to allow enough windows of the proper conditions to conduct underburning. To maintain the benefits of treatments, future maintenance underburns would need to be accomplished to prevent fuels buildup, restrict establishment of white fir trees and otherwise maintain desired conditions on the landscape.

Should prescribed fire treatment result in openings greater than two acres, reforestation would be considered. In MA 1 (Mule Deer Winter Range), if prescribed fire treatments does not result in meeting objectives related to seral stage diversity in bitterbrush, mechanical treatment with a mower/slashbuster would be utilized.

Aspen Stand Maintenance and Restoration

Cut encroaching conifers less than 21 inches dbh that are within 60 feet of aspen on approximately 149 acres of stands distributed across the project area. In order to protect new aspen sprouts from browsing and provide fawning cover, portions of cut trees would be retained on site. As needed, stands may be treated with prescribed fire to help regenerate clones. Stands to be treated are shown on Map Figure 2-4 at the end of Chapter 2.

Mahogany Stand Restoration

Remove encroaching juniper and conifers to allow for increases in the mahogany component on about 218 acres. Cut and remove conifers less than 21 inches dbh and non-old growth juniper

within 60 feet of mahogany shrubs to provide for existing plant release and ground disturbance for seed germination. Stands to be treated are shown on Map Figure 2-4 at the end of Chapter 2.

The definition of old growth juniper is as stated in “*Old Growth Western Juniper Woodlands*” (Miller, 1999): As juniper ages, canopy morphology shifts from cone shaped to rounded top tree. As age advances, the tree may also develop a combination of the following characteristics: broad non-symmetrical tops, deeply furrowed bark, twisted trunks or branches, dead branches and spike tops, large lower limbs, trunks containing narrow strips of cambium, hollow trunks, large trunk diameters relative to tree height, and branches covered with bright yellow green lichen (*Letheria* sp.).

Meadow Enhancement

Cut encroaching conifers and non-old growth junipers and remove where consistent with other management and restoration goals to restore meadow size and function. All meadows (about 4,000 acres total) in the project area have some degree of encroaching juniper, lodgepole pine and/or small ponderosa pine trees. Prescribed fire may be used where necessary to reduce slash and revitalize ground vegetation. Timing of treatments would be coordinated with range managers to take advantage of pasture rest-rotation schedules that are in place. Meadow areas to be treated are shown on Map Figure 2-4 at the end of Chapter 2.

Road Management Activities

Routine maintenance could occur on up to approximately 200 miles of existing transportation system roads, including haul routes outside of this planning area. Road maintenance actions may include clearing brush and trees from the travel way, ditch and culvert cleaning, slough and slide removal, blading and watering, installation of waterbars, earthen berms and/or cross ditches.

An interdisciplinary team completed a project level roads analysis as a separate component of this landscape restoration project. The roads analysis was focused on providing a transportation system that is safe, reduces ecological impacts, and meets immediate and projected long-term public and resource management needs. Appendix A contains a summary of the *Black Hills Project Roads Analysis Recommendations*. As identified and recommended through the *Black Hills Project Roads Analysis*:

- 30 miles of roads would be closed post-implementation.
Road closure is performed by constructing barricades of rock, earthen berms or logs, or a combination of any of these near the beginning of a road. Closure materials are usually acquired onsite, if possible. Existing culverts on these roads would be removed and cross ditches and waterbars would be installed to control drainage. Closed roads are designated as “Operational Maintenance Level 1” in the Forests’ transportation system database following their implementation.
- 94 miles of roads would be decommissioned post-implementation.
Road decommissioning effectively removes the road from vehicular access and is meant to allow full revegetation and hydrologic function of the roadway’s footprint on the land. Road decommissioning can be a collection of actions ranging from surface scarification or subsoiling with the road prism left intact, to a complete recontouring of the road prism back to a natural slope. In all road decommissioning, culverts are removed and their sites rehabilitated. Typically, revegetation is accomplished through natural seeding or

tree seedling planting of the former roadway. Decommissioned roads are removed from the Forests' transportation system database.

Roads proposed for closure or decommissioning are shown on Map Figure 2-5 Road Management Recommendations at the end of Chapter 2.

Maintenance level changes would occur on existing system roads as follows:

Table 2-1. Maintenance Level Changes to Roads in Black Hills Project area

Currently Maintenance Level I, raise to Maintenance Level II	
3462029 (0.65 miles)	3462048 (0.19 miles)
3462032 (1.47 miles)	3462058 (0.13 miles)
3462033 (1.64 miles)	3462162 (0.87 miles)
3462041 (0.24 miles)	3462422 (1.54 miles)
3462046 (1.25 miles)	3462424 (0.47 miles)
Currently Maintenance Level III, drop to Maintenance Level II	
3462347 (5.61 miles)	
Currently Maintenance Level II, raise to Maintenance Level III	
3462000 (8.51 miles)	

Changes to the Forest Motorized Travel Management Plan

The Fremont-Winema National Forest completed the [Motorized Travel Management Project Environmental Assessment](#) and the Decision Notice was signed on July 8, 2010. Implementation of the decision will begin with the publication of the Motor Vehicle Use Map (MVUM) likely sometime in 2011. After publication of the MVUM, motor vehicle use is allowed only on designated roads and trails and in designated areas. Project level decisions that would result in changes to motorized access would be incorporated into updated publications of the MVUM.

Some components of the road management proposals that are included in the action alternatives of the Black Hills Project would lead to changes of the MVUM.

The proposed maintenance level changes that are included in both action alternatives of the Black Hills Project would result in changes to the MVUM as follows:

Road 3462347 would change from *allowing only highway legal vehicles* to allowing all motorized vehicles. Motorized access to dispersed camping would be allowed.

The following roads or portions of roads would be **added to the MVUM**, allowing access for all motorized vehicles and motorized access to dispersed camping:

3462029 (0.65 miles)	3462048 (0.19 miles)
3462032 (1.47 miles)	3462058 (0.13 miles)
3462033 (1.64 miles)	3462162 (0.87 miles)
3462041 (0.24 miles)	3462422 (1.54 miles)
3462046 (1.25 miles)	3462424 (0.47 miles)

Roads shown as Maintenance Level 1 (closed) in Appendix A - *Road Management Recommendations for the Black Hills Project* would temporarily be opened for use by Forest

Service personnel or contractors during implementation of the activities contained in the action alternatives. These roads would remain closed to motorized access for the public.

Level 2 roads proposed for closure or decommissioning under the action alternatives as listed in the table of Appendix A would no longer be available for motorized vehicle use and the MVUM would be updated in the future to reflect these changes.

The Motorized Travel Management Decision imposed seasonal restrictions on certain roads to prevent disturbance in mule deer winter range. Use of roads listed below is restricted during the period of December 1 to March 31 per the Motorized Travel Management Decision. This restriction may temporarily be lifted during implementation of a selected action alternative of the Black Hills Project if approval to operate during winter months is granted for a particular season.

3462124	3462262
3462026	3462263
3462509	3462438
3462462	3462457

Commercial Thinning Treatments of Alternatives 2 and 3

The overall objectives are to emulate historical forest conditions of pattern, composition, structure, and density of vegetation, where a crown fire will not readily occur, insects and disease are at endemic levels of mortality, and the landscape is resilient when disturbances occur. Thinning densities would vary by forest type (keyed to plant associations) and objectives for the site. In thinned areas, the tree spacing retained would typically be denser in mixed conifer sites and less dense in ponderosa pine sites.

The thinning prescriptions in both action alternatives would be designed to achieve the following objectives:

1. Restoration of ecologically desirable conditions of the majority of the landscape, including retention of existing and restoration of historic old tree populations.
2. Reduce stand densities, while increasing the mean diameter of stands.
3. Introduce and emphasize spatial complexity through variable density thinning from below to achieve a historic range of conditions from 30-120 square feet of basal area, favoring retention of large and old trees, especially ponderosa pine and sugar pine. Sufficient stock of younger trees would be retained to serve as replacements when existing large, old trees are lost to senescence or other natural causes.
4. Shift composition toward more fire- and drought-tolerant species, such as ponderosa pine and sugar pine. A fir component historically endemic to the forest around Spodue Mountain would be retained to maintain specialized habitat for wildlife.
5. Retain 5-15% of each treatment unit greater than 20 acres in unthinned patches (skips) to provide for mule deer cover and habitat diversity across the landscape. Unthinned patches would be irregular in shape and range in size from 1/8 to 1/2 acre.

6. Retain natural openings and create gaps designed to mimic natural openings from 1/10th to 2 acres in size on 5-10% of units greater than 20 acres. Structure could be retained in some gaps but would not be retained in all gaps.

Thinning treatments would be coordinated and scheduled to coincide with the prescribed fire treatment priorities and strategy. Cut trees would be removed to be utilized as sawlogs or biomass. Live ponderosa, sugar and lodgepole pine trees 21 inches dbh or greater would be retained, except for the occasional tree removed for safety or operational needs (2430 Letter from Regional Forester, 2/2/1999). Retention and survivability of older trees (e.g. >21") would be improved by removing ground and ladder fuels and competing trees in an area around each older tree equal to about 2 times the drip-line of the crown of the tree. Where several old trees are present the treated areas may overlap. The publication *Identifying Old Trees and Forests in Eastern Washington* (Van Pelt 2008) would be used to help in identifying old trees that may be less than 21 inches dbh and are appropriate to retain within the context of restoration prescriptions.

Over the past five years there has been a marked increase in insect related mortality, particularly in mid-diameter lodgepole pine trees. There is potential for additional mountain pine beetle attacks to hit stands, particularly in the northern portion of the project area. Treatments in lodgepole pine stands that contain multiple layers in good condition for species such as black-backed woodpeckers would be coordinated with the Zone Wildlife Biologist. Existing snags would be retained at quantities that would meet the standards prescribed by the Regional Forester's Eastside Forests Plan Amendment 2 (USDA 1995). Dead lodgepole less than 21 inches in diameter may be cut and removed as a commercial product as either sawlog or biomass to reduce fuel loadings, making it safer to apply prescribed fire.

Pine and white fir stumps would be treated with a borax product to prevent the spread of root rot (*Use of Borax to Prevent Spread of Annosus Root Disease*, Fremont-Winema National Forest 7/2/2010 Letter to District Rangers).

With the exception of Sycan River, thinning treatments would occur within portions of RHCAs of perennial and intermittent streams. Treatment would be similar to the upland treatments described above, however leave basal areas and stocking densities would be toward the higher end.

Slash at landings would be piled for burning in the future if the material cannot be used for biomass or firewood. When the treatments are completed, landings would be scarified to provide a seedbed for re-vegetation and appropriate drainage installed to reduce erosion potential.

Existing large down wood and snags would be retained at a rate to meet the standards prescribed by the Regional Forester's Eastside Forests Plan Amendment 2 (USDA 1995). To the greatest extent possible, skidtrail and landing locations would be designed to avoid large snags. Snags that cannot be avoided in treatment areas, and determined to pose a safety hazard (as defined in *Field Guide for Danger Tree Identification and Response*, 2008) would be felled and retained on site as down wood if needed to meet standards per the Forest Plan. Danger trees on Forest Roads

used for contractor access or timber haul, including external haul routes, would be felled and may be removed.

There is within the planning area about 120 acres of stands termed “moist lodgepole”. These stands would be thinned towards 30 square feet of basal area in a clumpy/patchy pattern. Cutting of lodgepole pine less than 21 inches dbh would be priority. Lodgepole and ponderosa pine over 21 inches dbh would be retained along with healthy smaller diameter ponderosa pine. Treatments would be aimed at restoring the hardwood component particularly any aspen clones within these moist stands.

Alternative 2 – Proposed Action

Areas to be treated under Alternative 2 are shown on Map Figure 2-1 Alternative 2 Treatment Areas at the end of Chapter 2. We estimate that the thinning component of Alternative 2 would yield approximately 30-35 million board feet of merchantable timber.

Thinning with ground-based equipment

Approximately 16,072 acres would be treated using ground-based equipment. Thinning would be accomplished by mechanized feller-buncher, grapple skidder operation with product manufacture on landings. To the extent possible, old skidtrails and landing would be utilized. Harvested trees would be yarded to landings with limbs and tops attached to reduce accumulation of activity fuels within treated areas. Landings up to an acre in size may be necessary to store small diameter material until it could be transported for use as biomass.

Thinning Using Helicopter Logging System

Approximately 2,644 acres would be treated using helicopter logging systems. Thinning would be accomplished using chainsaws and logs would be yarded to landings via helicopter logging systems. To reduce activity fuels, the tops of trees would be yarded to the landing with the last log of the tree. Landings up to two acres in size may be necessary for safe operations and to store small diameter material until it could be transported for use as biomass. Up to 30 landings may be needed for safe and efficient operation of a helicopter system, including a service landing where fueling and maintenance would occur.

Forest Plan Amendment for Treatments in Allocated Old Growth MA 3 and MA 14

The Forest Plan allocates Management Areas 3 and 14 (MA 3 and MA 14) for Old Growth Dependent Species Habitat. Within the Black Hills Project planning area a total of approximately 2,633 acres have been so allocated. Specifically, the Forest Plan allocates about 675 acres of old growth ponderosa pine areas for goshawk habitat, within the planning area. In addition, the Forest Plan also allocates about 264 acres of old growth pine-associated areas for goshawk habitat. Approximately 1,694 acres of old growth lodgepole pine have been allocated for three-toed woodpecker habitat.

The Fremont Forest Plan describes two prescriptions associated with old growth management areas. Allocated pine and pine-associated old growth stands are to be “dedicated” while lodgepole pine old growth stands are to be “managed”.

Forest Plan Standards and Guidelines for allocated pine and pine-associated old growth (MA 3 and 14) include the following:

- *Old-growth pine and pine-associated stands are dedicated, i.e. receive no timber management; however, these stands may have wildlife habitat enhancement projects to maintain or enhance old-growth habitat (Forest Plan, pages 139 and 196).*

The Forest Service proposes an amendment to the Forest Plan to utilize a commercial timber sale in the Black Hills Project as a tool to accomplish thinning treatment in “dedicated” pine and pine-associated stands to develop sustainable conditions that would benefit old growth habitat. Alternative 2 proposes thinning about 471 acres of pine and 183 acres of pine-associated old growth. Treatments would be focused on maintaining or promoting LOS conditions, while creating resilient forest conditions.

Forest Plan Standards and Guidelines for allocated lodgepole pine old growth (MA 3 and 14) include the following:

- *Lodgepole pine old growth will be managed on a 120-year rotation. Select and place under management replacement stands, with emphasis on stands with the earliest replacement potential (Forest Plan, page 139 and 196).*

In Alternative 2 of the Black Hills Project, the Forest Service proposes an amendment to the Forest Plan to prescribe treatment in “managed” old growth lodgepole other than the described two-tiered system of converting an allocated stand to early seral stage, while designating another stand as replacement old growth. Allowing wildfire to burn uncontrolled or clearcutting through these lodgepole stands is not socially acceptable in the current landscape. Such a pattern is not likely to provide desired resource values. This proposal would treat about 726 acres or 43% of the total allocated lodgepole old growth in the planning area without designating other stands as replacement old growth. This treatment is not identifying or selecting replacement stands because lodgepole stands in the planning area are fairly uniform in age and size, and increased mortality from mountain pine beetles has affected all stands in the planning area. The stands to be treated are ones that have experienced low-moderate mortality from the mountain pine beetle. Stands would be treated by creating openings of ½ to 1 ½ acres in size to promote a second cohort of lodgepole through natural regeneration. Approximately 50% of the individual stands would be treated with openings, focused around aspen in the stands. Treatments would be focused on creating openings within stands to facilitate seral stage diversity that will provide for future old growth long-term, while still allowing the stands to function as old growth in the short-term. Heavily stocked patches would be retained along with existing snags and individual trees dispersed throughout the stands. The areas proposed for treatment range from 60-170 acres in size. This amendment would not change the allocation of old growth habitat; it only seeks to improve conditions for the long-term health of these stands.

Old growth stands proposed for treatment are shown on Map Figure 2-1 Alternative 2 Treatment Areas.

Alternative 3 – No Helicopter or Allocated Old Growth Treatments

Areas to be treated under Alternative 3 are shown on Map Figure 2-2 Alternative 3 Treatment Areas at the end of Chapter 2. We estimate that the thinning component of Alternative 3 would yield approximately 20-25 million board feet of merchantable timber.

Thinning with ground-based equipment

Approximately 15,118 acres would be treated using ground-based equipment. This includes about 740 acres within treatment corridors of 300 feet (150' each side) along existing roads on and around Spodue Mountain. These treatment corridors would be designed to break up the continuous fuel blocks and provide for safe ingress and egress in the area of Spodue Mountain. Forested stands on Spodue Mountain would be treated primarily through the use of prescribed fire.

Thinning would be accomplished primarily by mechanized feller-buncher, grapple skidder operation with product manufacture on landings. Where machine thinning is not possible, traditional chainsaw thinning would be used. To the extent possible, old skidtrails and landing would be utilized. Harvested trees would be yarded to landings with limbs and tops attached to reduce accumulation of activity fuels within treated areas. Landings up to an acre in size may be necessary to store small diameter material until it could be transported for use as biomass.

Project Design and Resource Protection Measures Applicable to Alternatives 2 and 3

In response to public comments on the proposal, existing standards and guidelines, and resource specialist concerns, project specific design and resource protection measures were developed to prevent potential impacts to resources as a result of implementing the proposed action or an alternative action. These are measures that are considered routine, have been used on similar projects, and are either incorporated into contract provisions or accomplished between appropriate resource specialists, and have proven to be effective. The particular design of the action alternatives and these resource protection measures are used as a basis for determining and disclosing effects in the Environmental Consequences (Chapter 3) discussions.

Special Uses

1. Electronic sites on Spodue and a buried cable that runs along Road 3462 and through the forest up to the top of Spodue Mountain must be protected during all activities.

Cultural and Heritage Resources

1. There would be pre-operations coordination between the assigned Archaeologist and either the sale administrator, contracting officer's representative, or force account work leader to discuss all information pertaining to cultural resource protection. A clear protective strategy for each of the known sites in the project area will be communicated. Examples of protective strategies include flag and avoid, hand felling, and requirements for locations of temporary roads, landings or log decks, and/or monitoring. Specifics are described in the Archeology Survey Report (2008) for the project.
2. Establishment of protection lines or other avoidance measures, such as lighting patterns would be implemented prior to any prescribed burning near cultural sites.
3. In the event of new cultural materials being discovered during on-the-ground preparation for the project or at any time during any ground disturbing activity, work in the immediate vicinity would cease until the Eastside Archeologist has reviewed the site on the ground and protection measures have been developed.

Soils/Hydrology

1. Best Management Practices – All roadwork associated with implementation of the project would follow the Roads Best Management Practices (Fremont National Forest Supplement). All timber sale-associated work (all thinning treatments) would follow the Timber Sale Best Management Practices (Fremont National Forest Supplement). See Appendix B. BMPs provide project specific incorporation of the guidelines in the Fremont National Forest Soil Productivity Guide (USDA 2000, as amended 2002).
2. In the event that a temporary road crosses an intermittent stream channel, all work at the crossing, including construction and decommissioning, would occur when the stream channel is dry or within the ODFW preferred instream work window (August 1 to September 30).

3. Thinning treatments of moist lodgepole stands, and encroaching conifers from aspen stands and meadows would be accomplished under appropriate conditions (i.e. dry soils, frozen ground, or adequate snowpack) that prevent adverse impacts to soils (see BMPs).

Sycan Wild and Scenic River

1. No temporary road construction in Wild and Scenic River Corridor.
2. No fire ignition would occur within 100 feet of the river.
3. No burn piles would be located within 100 feet of the river.
4. No water withdrawal from the Sycan River or its tributaries for dust abatement on roads.

Fisheries

Small Tree (Pre-commercial) Thinning

1. No trees would be cut on any streambank.
2. When practicable, trees would be felled toward stream channels.
3. Unless a fuels issue, trees would generally be left whole (not lopped and scattered or crushed) within RHCAs.

Commercial Thinning within RHCAs

4. All commercial treatment within RHCAs would be coordinated with and approved by the Southeast Zone Fisheries Biologist prior to implementation.
5. No cutting of commercial sized trees within 10 feet of any stream channel. No ground-based equipment is to operate within 30 feet of any stream channel.
6. Temporary roads will not cross perennial streams.

Prescribed Fire Operations

7. Fire ignition during prescribed fire operations would cease 50 feet from stream channels.
8. Firelines would not be constructed within RHCAs.
9. To the greatest extent possible/feasible all fireline would be restored to pre-disturbance contours. All fireline rehabilitation would occur in the same calendar year that the burning is implemented. All fireline would be rehabilitated to the following standards:

Hand-Constructed Fireline: Hand construct waterbars according to the spacing guidelines shown in the table below. Where feasible, angle waterbars to direct water outlet into the unburned side of the fireline, and pull back berms.

Table 2-2. Minimum Waterbar Spacing for Handline Rehabilitation

Fireline Gradient (%)	Minimum waterbar spacing (ft.)
0-20	100
21-40	50
41+	25

Tractor Plow-Constructed Fireline: Construct waterbars according to the spacing guidelines shown in the table below. Where feasible, angle waterbars to direct water outlet into the unburned side of the fireline, and pull back berms.

Table 2-3. Minimum Waterbar Spacing for Tractor Plow Fireline Rehabilitation

Gradient (%)	Cross drain spacing (feet)
0-5	200-160
6-10	160-120
11-15	120-100
16-20	100-60
21-30	60-40
31-45	40-25
46 +	25

Invasive Species

2. Notify Eastside Botanist at least 30 days prior to any off-road equipment operating within the project area to ensure all noxious weed sites are properly flagged for avoidance.
3. Weed sites would be avoided when possible. Forest Service personnel implementing activities would be provided a map of known weed locations within the area so disturbance can be minimized. Avoidance of weed sites would minimize the potential of spreading seeds through the implementation of project activities.
4. Areas infested with weeds would not be used as log deck landings, fire crew bases, helibases, camps, or staging areas.
5. If noxious weed sites are discovered within the project area, report the sighting to District Weed Personnel. The site would be reviewed on the ground and additional invasive plant prevention practices would be developed as appropriate.
6. Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism (including public works and service contracts), require the cleaning of all heavy equipment (bulldozers, skidders, graders, backhoes, dumptrucks, etc.) prior to entering National Forest System Lands. This does not apply to initial attack of wildland fires, and other emergency situations where cleaning would delay response time (USDA Forest Service, 2005).

7. Inspect active gravel, fill, sand stockpiles, quarry sites, and borrow material for invasive plants before use and transport. Treat or require treatment of infested sources before any use of pit material. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists (USDA Forest Service, 2005).
8. Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists, incorporate invasive plant prevention practices as appropriate (USDA Forest Service, 2005).
9. Native plant materials are the first choice in revegetation for restoration and rehabilitation where timely natural regeneration of the native plant community is not likely to occur. Non-native, non-invasive plant species may be used in any of the following situations: 1) when needed in emergency conditions to protect basic resource values (e.g., soil stability, water quality, and to help prevent the establishment of invasive species); 2) as an interim, non-persistent measure designed to aid in the re-establishment of native plants; 3) if native plant materials are not available; or 4) in permanently altered plant communities. Under no circumstances will non-native invasive plant species be used for revegetation (USDA Forest Service, 2005).

Wildlife

1. Should any proposed or listed endangered, threatened, or sensitive species be found during project activities within, adjacent, or near enough that activities could be a disturbance, activities would be halted until the effects of the activity can be determined and protection measures adopted.
2. If an active raptor nest is found during operations, Forest Plan Standards and Guidelines would be followed at a minimum. The Forest Plan states that “*major activities such as logging and road construction adjacent (within 300 yards) to active raptor nests, should be postponed until young have fledged (usually around July 30)*” (Forest Plan p.180).
3. Prairie Falcon nest protection – Limited operating period (LOP) within ½ mile of the nest site. No activities to occur during the LOP of April 1 through July 30. This restriction may be waived in a particular year if surveys reveal that the species indicated is non-nesting or that no young are present that year.

Air Quality

1. Plastic sheeting material would not be used on any piles planned for burning.
2. Conduct prescribed fire in compliance with National Ambient Air Quality Standards, Oregon Department of Environmental Quality regulation and restrictions, and under the Oregon Smoke Management Plan regulations and restrictions.

Roads

1. Forest specifications for snow removal would govern winter haul operations on all FS system roads.

Range

1. Implementation of project activities would be coordinated with the grazing permittees, through the Range Specialist, so that permitted use of the grazing allotments is not adversely affected.

Monitoring

The Fremont National Forest Land and Resources Management Plan includes a monitoring plan in Chapter 5 (pages 207-231). This monitoring plan identifies key activities and outputs to be tracked to ensure that activities reasonably conform to Management Area direction and that outputs satisfy the objectives of the Forest Plan. Forest Plan monitoring would be relied upon and is considered adequate with the exception of project-specific monitoring identified below.

Cultural Resources

1. Recorded sites would be monitored during project implementation for any impacts.

Noxious Weeds

1. Revisit project areas to determine the effectiveness of prevention measures, and to detect new infestations before they spread.

Summary Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. The analytical outputs represented below are for the purpose of quick comparisons between alternatives. Refer to Chapter 3 for details.

Table 2-4: Summary Comparison of Alternatives –Purpose and Need and Issues

Purpose/ Need or Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No Helicopter or Old Growth Treatments
Need for reduced forest stocking levels and stand structures closer to historic	Does not respond to the need to reduce stand densities or move stand structures closer to historic conditions. 60 % is Late Seral Multilayer Forest and 2% is Late Seral Single Layer Forest.	19,016 acres treated to reduce densities. 17% would be in Late Seral Multilayer Forest and 45% in Late Seral Single Layer Forest moving forested stands closer toward historical conditions.	15,418 acres treated to reduce densities. 29% would be in Late Seral Multilayer Forest and 33% in Late Seral Single Layer Forest moving forested stands closer toward historical conditions.
Need for reduced fuel loadings and reintroduction of fire on the landscape	Does not respond to the need to reduce fuel loadings, nor is it responsive to the need to reintroduce fire on the landscape.	Reduces conifer stocking levels, ladder fuels and accumulated wildland fuels addressing entire stand conditions in treated areas. Allows for reintroduction of fire across the landscape. Greater reduction in crown fuels and treatment extent on Spodue Mountain over Alt.1 and 3. Greatest potential for reduction of surface fuels, canopy bulk density, and crown base height.	Would not reduce potential wildfire behavior or severity as effectively as Alt. 2 in the steep areas on and around Spodue Mountain because ladder fuels and canopy bulk density would remain high. Several entries of prescribed fire treatment would be needed to bring about desired conditions on Spodue. Allows for reintroduction of fire across the landscape. Old growth stands would remain at risk to losses from wildfire.
Need to reduce road densities	Does not respond to the need to reduce road densities in the Black Hills area.	Would close about 30 miles and decommission about 94 miles of roads. Meets Forest Plan direction to reduce overall road densities across the Forest. Allows for continued reasonable and safe access for fire suppression, forest management, range management, terrestrial and aquatic species protection and public use/recreation.	Same as Alt. 2

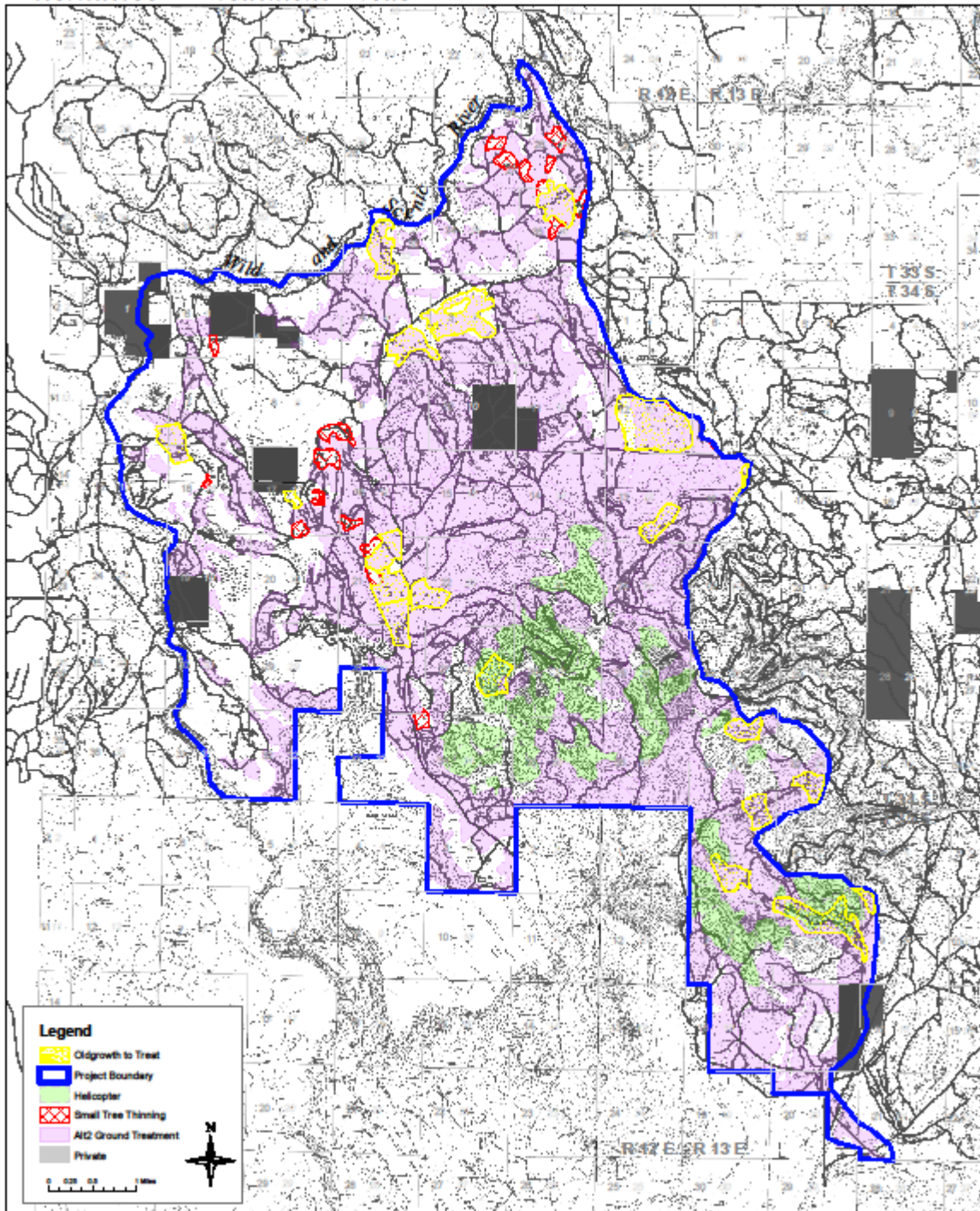
Table 2-4: Summary Comparison of Alternatives –Purpose and Need and Issues

Purpose/ Need or Issue	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3 No Helicopter or Old Growth Treatments
Provide forest products	Does not produce any merchantable timber products.	Expected to produce 30 – 35 million board feet of merchantable timber products.	Expected to produce 20 – 25 million board feet of merchantable timber products.
Issue # 1 Treatment of Forest Plan Old Growth	No thinning of Forest Plan “dedicated” or “managed” old growth would occur. Stands would continue struggling for resources and be at risk of insect attacks and stand replacing wildfires. No direct effects to old growth species or their habitat.	Thinning young to mid-story trees in the “dedicated” old growth would serve to enhance conditions for existing old trees making stands more resilient and sustainable. “Dedicated” stands would still provide habitat for goshawks after treatment. Treatment of “managed” Lodgepole stands would promote development of seral stage diversity that will provide for habitat into the future. “Managed” stands would still provide habitat for black-backed woodpeckers.	No thinning of Forest Plan “dedicated” or “managed” old growth would occur. Stands would continue struggling for resources and be at risk of insect attacks and stand replacing wildfires. No direct effects to old growth species or their habitat.
Issue #2 Economics of helicopter logging on Spodue Mountain	No active management of the resources so no additional costs incurred. Generates no goods or services to local and regional economies.	Estimated that \$1.8 - \$2.2 million would be needed to subsidize the cost of helicopter logging unless timber values rise substantially in near future. Allows for more thoroughly treating the stands on Spodue Mountain.	Without the helicopter thinning several entries of prescribed fire treatment would be needed to reduce fuels to acceptable levels and bring about desired stand conditions.

Alternative Maps

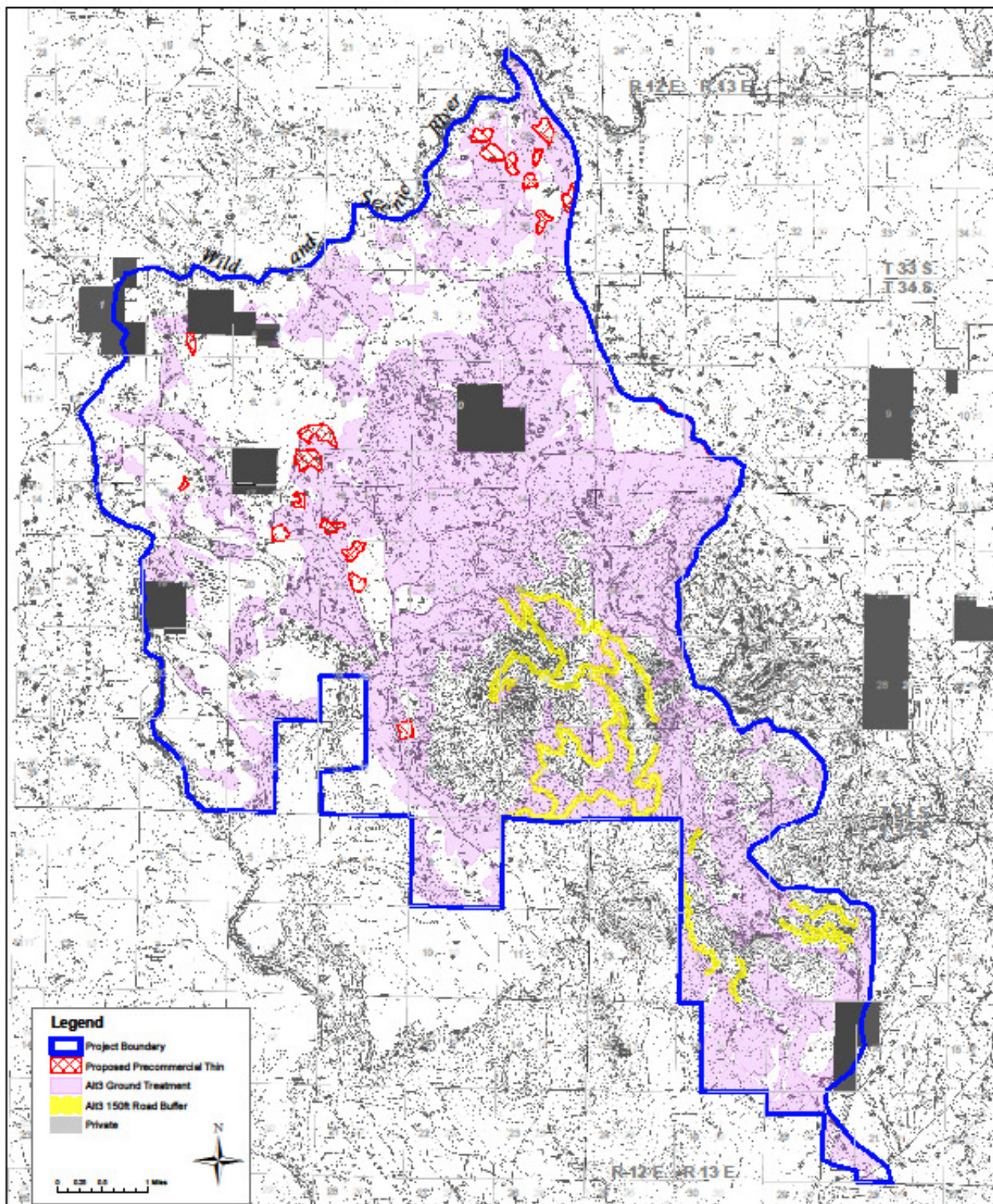
*Black Hills Analysis
Alternative 2 Treatment Areas*

Figure 2-1



Black Hills Analysis
Alternative 3 Treatment Areas

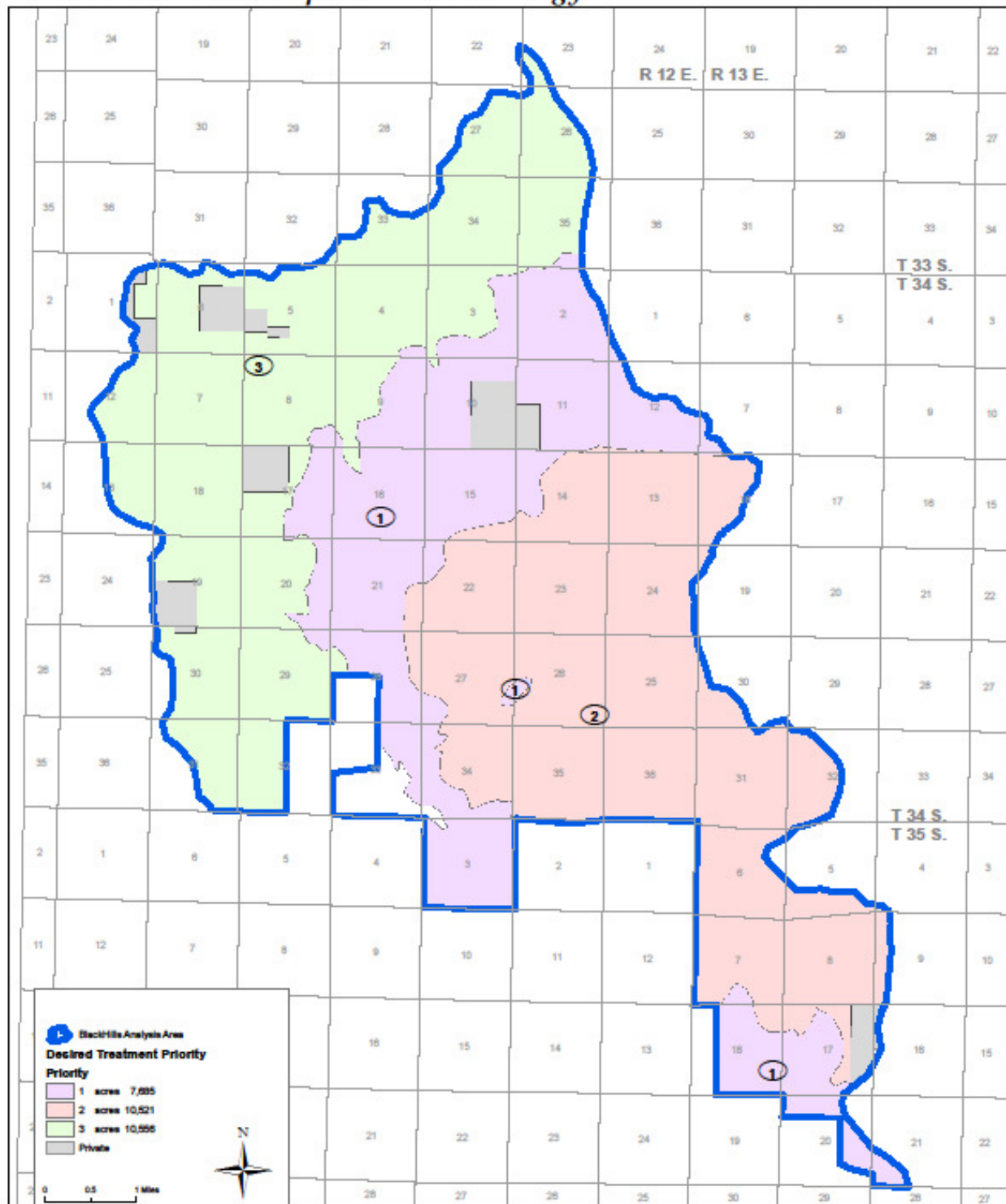
Figure 2-2



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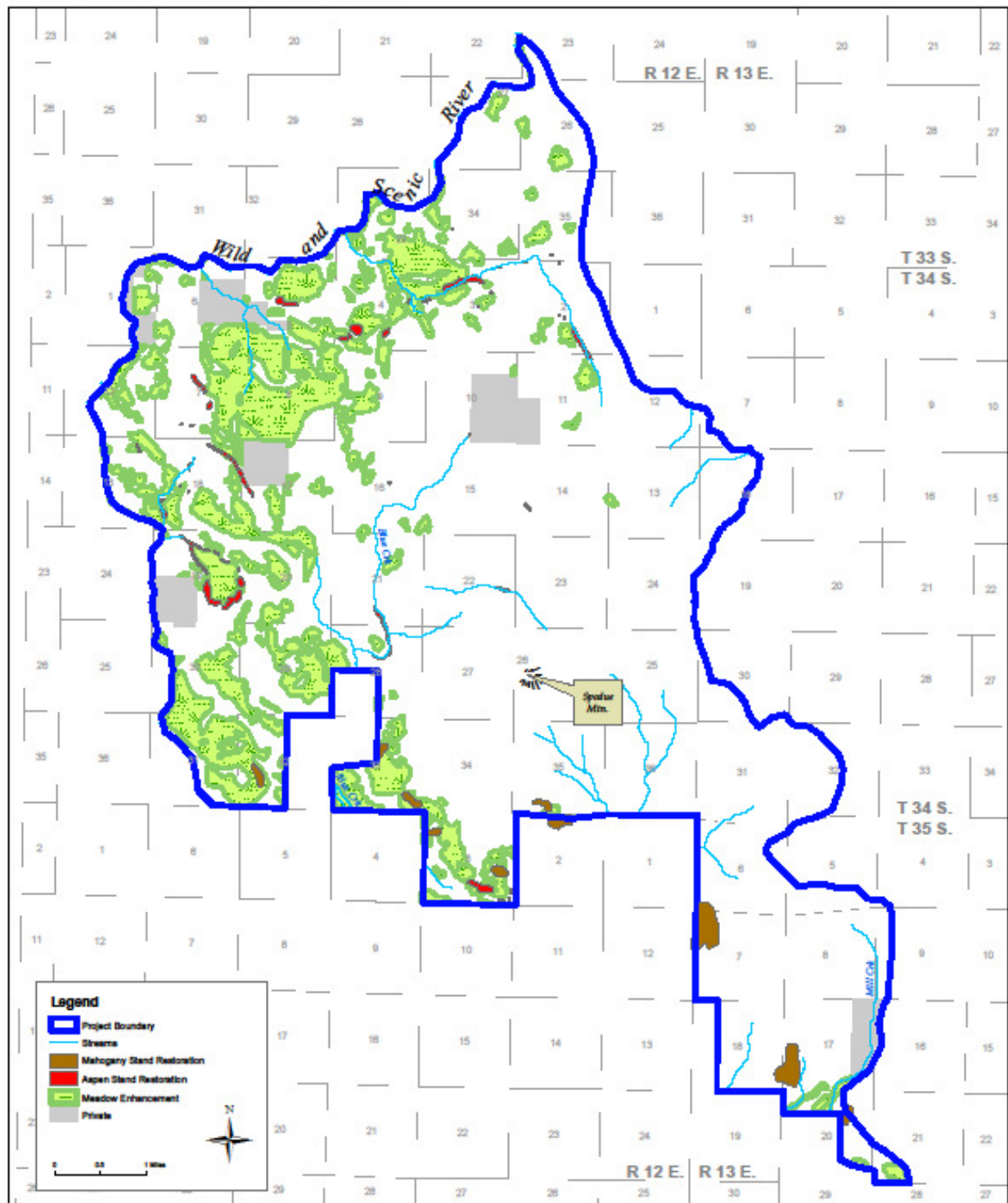
***Black Hills Analysis
Prescribed Fire Landscape Treatment Strategy***

Figure 2-3



Black Hills Analysis
Other Restoration Activities

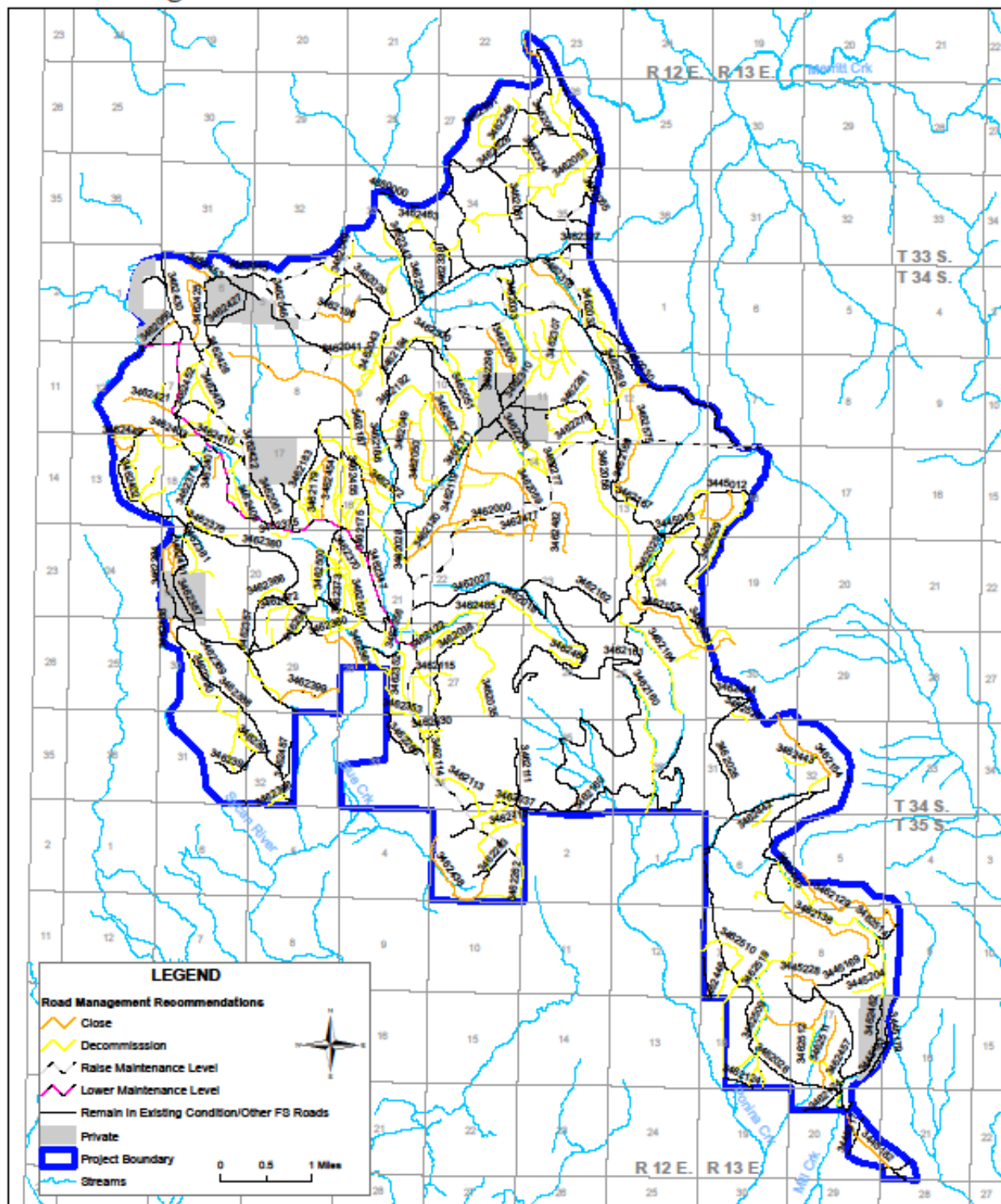
Figure 2-4



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Black Hills Analysis Road Management

Figure 2-5



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